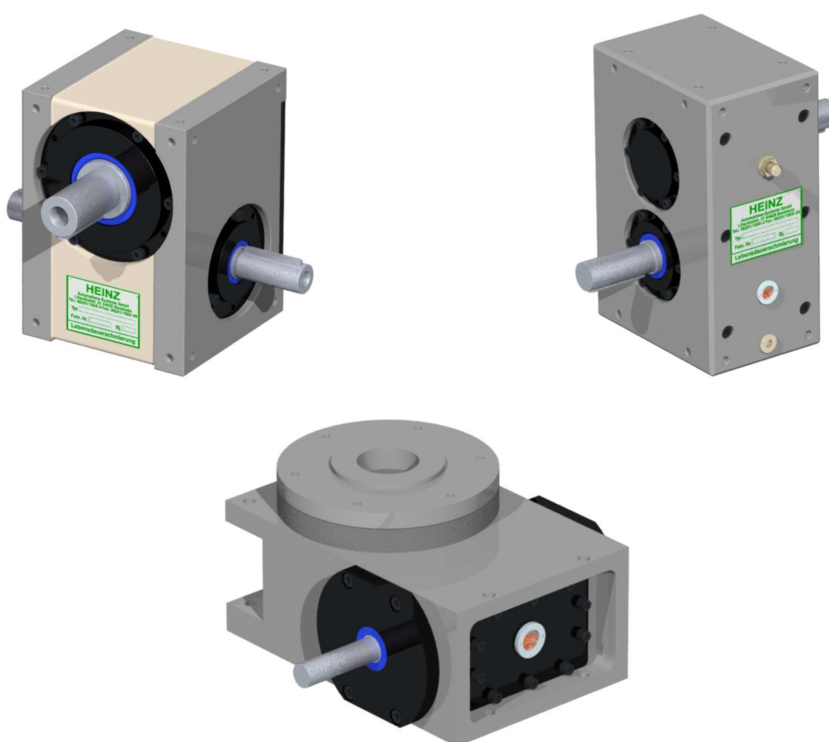




Operating Instructions

Globoidal cam gear



Type :

Serial No. :

C O N T E N T S

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7. Final remark

1. General

1.1 Validity

These operating instructions are valid for globoidal cam gears. They are to be read and applied by all persons in the user's premises who are made responsible for the installation, operation, maintenance or repair of these gears.

For the sake of simplicity, the globoidal cam gears will be referred to as "the gears" within the following instructions.

Every gear is manufactured to the state-of-the-art and according to recognized safety regulations.

Applications other than specified or exceeding the limiting parameters, e.g. higher speeds and/or loads or other installation positions, are considered to be contrary to agreement. **The manufacturer shall not be held responsible for any damage resulting from this. In such cases, the risk is carried solely by the operating company.**

The agreement regarding application also covers reading the operating instructions and compliance with the inspection and maintenance stipulations. Maintenance work may only be carried out by qualified personnel who are acquainted with the principles of the gear function.

1.2 Safety instructions

The gear corresponds to the recognized safety regulations. When employed as part of a machine or plant, danger of injury or death for the user or a third person can result, e.g. due to removal of the lever, gear wheel with chain or similar parts. In such cases, suitable local protective measures should be taken by the user.

1.3 Shipment

Every gear is subjected to go through an inspection process and is properly packed. In spite of this, we request that the gear is unpacked immediately on arrival at the installation location and checked for transport damage.

Any complaints should be reported immediately to the transport company.

1.4 Transport regulations

Eyebolts may be screwed into the fixing holes provided. Lifting ropes or chains may only be applied on these eyebolts. The weight of the gear should be taken from table 1.5.

1.5 Weight of the gears

Basic series

Gear type	Housing	Weight without motor [kg]	Weight with standard motor [kg]
H(T)SG 63	Aluminium	12	24
H(T)SG 80	Grey cast	28	40
H(T)SG 110	Grey cast	57	80
H(T)SG 140	Grey cast	116	146
H(T)SG 180	Grey cast	200	245
H(T)SG 200	Grey cast	345	405
H(T)SG 254	Grey cast	400	470

Modified series

Gear type	Housing	Weight without motor [kg]	Weight with standard motor [kg]
HSG 54	Grey cast	8,5	-
HSG 80 E	Aluminium	28	40
HSG 80 M	Grey cast	27	39
H(T)SG 82	Grey cast	27,5	39,5
HSG 100	Grey cast	55,5	78,5
H(T)SG 108	Grey cast	52	75
H(T)SG 108 M	Grey cast	52	75
HSG 125	Grey cast	95	125
H(T)SG 133	Grey cast	98	128
HTSG 140 M	Grey cast	95	125
HTSG 152	Grey cast	135	170
H(T)SG 171	Grey cast	190	230
HTSG 178	Grey cast	190	230
H(T)SG 220	Grey cast	350	390
HSG 250	Grey cast	665	720

2. Instructions for application of the gears

2.1 Installation position

Due to its universal construction, the gear can be integrated into a machine or a plant in nearly every position required.

When placing the order, the customer can preset the installation position, the mounting position and possibly the oil holes.

The predetermined installation position is decisive for the lubrication of the gear components and may therefore not be subsequently altered at the plant location.

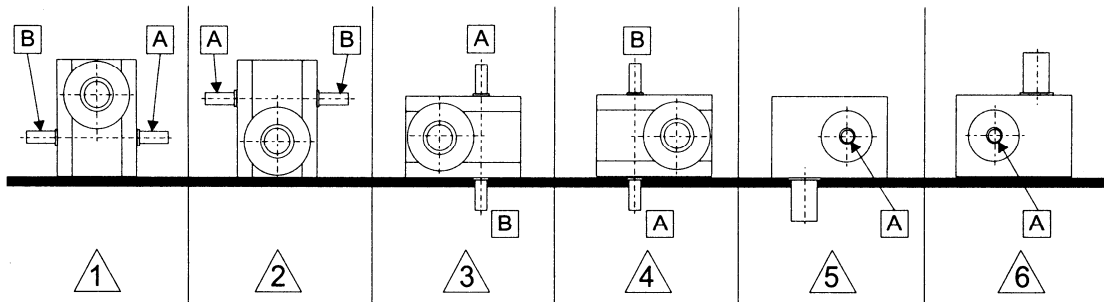


Illustration 1: Gear installation positions

2.2 Mounting the gear

Due to the principle of the functioning of the gear, the output shaft as well as the input shaft are subjected to variable torques. The following must therefore be observed:

- The gear must be mounted on a rigid machined surface.
- The fixing bolts must be secured and, if possible, the position of the gear should be additionally fixed by means of dowel pins.
- The connection between the gear and the driven load must be direct, free of play and torsionally rigid. This also applies to the drive side of the gear.

2.3 Gear operation

The following should be observed with regards to gear operation:

- Elasticity and play in the driven masses can result in vibration and must therefore be avoided.
- A possibly installed overload protection should be mounted on the output shaft.

3. Start up

3.1 Gear function

HEINZ gears form a compact, robust unit which, through the use of accurately calculated globoidal cams, enable the transformation of a constant input speed into an optimum, precise and impact-free (intermittent) output movement.

The cam rollers fitted in the turret are guided precisely in the globoidal curve by the hardened and ground cam path.

This cam path is formed with a variable slope and is divided into a dwell angle and index angle area. When the cam is rotated, the precise jolt and impact-free movement of the output shaft is produced by the cam path and the cam follower. As the cam course is constructed standard symmetrically, it is possible to choose rotation to the left or to the right.

The dwell angle area has a zero slope. Through this, the cam followers result in a precise, self-locking positioning of the output shaft without an additional locking mechanism.

When a brake motor is employed, the positioning of the output shaft is independent on the braking accuracy of the motor as the accurate positioning is dictated by the position of cam followers in the dwell angle area. The whole dwell angle area is available for braking (see 3.3).

3.2 Oil level

The oil level should be checked before start up. It is sufficient if the oil can be observed through the oil level indicating glass (see also 4.3 gear)

Basic series

modified series

Gear unit type	Oil qty. [L]	Gear unit type	Oil qty. [L]	Gear unit type	Oil qty. [L]
H(T)SG 63	0,40	HSG 54	0,20	HTSG 140 M	3,50
H(T)SG 80	0,75	HSG 80 E	0,75	HTSG 152	2,30
H(T)SG 110	1,80	HSG 80 M	0,60	H(T)SG 160	6,80
H(T)SG 140	3,30	H(T)SG 82	0,75	H(T)SG 171	5,5
H(T)SG 180	7,50	HSG 100	1,50	H(T)SG 178	7,10
H(T)SG 200	10,5	H(T)SG 108	1,60	H(T)SG 220	10,5
H(T)SG 254	18,0	H(T)SG 108 M	1,50	HSG 250	22,0
		HSG 125	3,80		
		H(T)SG 133	4,00		

3.3 Interruption Operation

If the dwell angle area of the globoidal cam is insufficient for the interval of interruption required for production, the interval can be prolonged by using a brake motor. The procedure is initiated by an end position switch which is operated by one of the cams connected to the input shaft. During the start up as well as during operation it has to be observed that after the braking has occurred, the shaft key groove of the input shaft has to be positioned parallel to face 6 of the housing and that it points towards the output shaft (in case of double shift also a torsion of 180° is possible, cam followers should be in the middle of the dwell).

If the gear is fitted with an additional indicator, it should be observed that after braking has occurred, the indicator is always positioned in the middle of the marking plate.

3.4 Important Instructions

With two speed drives, normal operation occurs always at the higher speed (high speed). The lower speed (low speed) may only be used for setting up the unit or moving into the dwell angle area after an emergency stop. During automatic operation, the gear may not be switched into the low speed position while the unit is in the movement phase. With control systems which only allow switching of the high speed through the low speed, this may only occur during the dwell angle, this means during the standstill period of the output shaft or rather within the marking plate.

Any damage which is caused by failure in complying with these instructions will result in the rejection of any guarantee claim by the manufacturer.

4. Maintenance Instructions

4.1. General Remark

In case of queries i.e. spare part orders, please state the type and serial number of the gear in question.

4.2 Drive

The maintenance instructions for the gear brake motor or other drive units should be taken from the instructions supplied by the corresponding manufacturer.

4.3 Motor brake

Due to wear of motor brake, the interruption in the dwell angle area as described in 3.3. should be checked from time to time. The brake should be re-adjusted or renewed if necessary.

4.4 Gear unit

4.4.1. Oil Lubrication

In Standard the gear unit is delivered with the synthetic lubricating oil **“Klübersynth GHE 6 – 460”**

It is lubricated for life, i.e. no oil changes are necessary at all. The oil level should be checked at regular intervals. Sufficient oil is present if when the gear unit is stationary the oil can be seen in the sightglass
 The lubrication of the cam rollers and the came is thus guaranteed

For rotating speed < 150 rpm	For rotating speed > 150 rpm
Klübersynth GHE 6 - 460	Klübersynth GHE 6 - 100
Mobil Glygoyle HE 460 (ISO V6 460)	Mobil Glygoyle 22 (ISO V6 150)
Shell Omala S4 WE 460	Shell Omala S4 WE 150



WARNING

Warning: Never mix different oil sorts!



WARNING

Only top up with the lubricant described above!

If used for the food industry, the gear unit is delivered with NSF H1 registered, conform to FDA 21 CFR § 178.3570 oil **“Klübersynth UH1 6 - 460”**

It is lubricated for life, i.e. no oil changes are necessary at all. The oil level should be checked at regular intervals. Sufficient oil is present if when the gear unit is stationary the oil can be seen in the sightglass
 The lubrication of the cam rollers and the came is thus guaranteed

For rotating speed < 150 rpm	For rotating speed > 150 rpm
Klübersynth UH1 6 – 460	Klübersynth UH1 6 – 150



WARNING

Warning: Never mix different oil sorts!



WARNING

Only top up with the lubricant described above!

4.4.2. Grease Lubrication

It is lubricated for life, i.e. no grease are necessary at all. The grease level should be checked at regular intervals.

Normal Grease Lubrication	NSF H1 registered, conform to FDA 21 CFR § 178.3570
Castrol Olit 00	Cassida RLS 00
Microlube GB 00	Klübersynth UH1 14-1600



WARNING

Warning: Never mix different oil sorts!



WARNING

Only top up with the lubricant described above!

5. Inspection instructions

5.1 Inspection Cycle

It is recommended to control the oil level approximately every 8000 operation hours in order to avoid any damage of the gear by leakage of oil.

5.2 24-Hour Service

Immediate availability of important components is guaranteed through stocking of a stand-by set (globoidal cam, output and cam followers) by the unit operator.

6. Spare parts installation

6.1 Remark

Please read the following complete text carefully before the disassembly.

All construction elements have to be cleaned and to be checked if they are in perfect condition before being installed. The list of spare parts may be helpful for the disassembly and the installation of the individual parts.

6.2 Globoidal mechanism

The mechanism is a unit consisting of globoidal cam, cam followers and turret. Due to a possible wear of the cam followers or the globoidal cam, it may be necessary to replace the following parts:

- Cam followers
- Turret
- Globoidal cam
- Complete mechanism

6.2.1 Replacing cam followers (globoidal cam stays built in)

- Drain oil
- Move input shaft into dwell angle area
- Unscrew end cap of output shaft
- Lift output shaft out of globoidal housing
- Unscrew stud bolts off turret (are glued in) and remove cam followers
- Check shaft bore of cam followers in the turret if they are damaged and possibly widened
- In case of defective bores: see 6.2.2
- In case of perfect condition of bores, push in new cam followers into turret
- In case of cam followers without key way, bore with core hole drill a centralisation in every cam followers shaft. The depth of centralisation depends on the centralisation point of the stud bolts according to DIN914 (German Industrial Standard)
- Secure cam followers with stud bolts (glue thread in)
- Check globoidal cam and replace by a new one if necessary (see chapter 6.2.3)
- Put output shaft with turret back into housing (observe the position of the shaft key groove of the output shaft)

- Apply appropriate permanently elastic sealing material upon cleaned sealing surface and install end cap
- Move input shaft and check regular movement of mechanism
- Fill in oil

6.2.2 Replacing turret (globoidal cam stays built in)

- In the case of a defective cam followers shaft bore remove (smaller) tapered roller bearing
- Remove stud bolts off turret and disassemble turret off output shaft
- Screw tight new turret with installed cam followers again and put in new studs
- Heat tapered roller bearing slightly (max. 80°C) and push over output shaft
- Put output shaft with turret back into housing (observe position of shaft key groove of output shaft)
- Proceed with assembly as describe in chapter 6.2.1

6.2.3 Replacing globoidal cam (turret stays built in)

- Drain oil
- Move input shaft into dwell angle area
- Screw off housing cover
- Release safety catch of securing steel sheets and unscrew lock nut
- Unscrew both eccentric covers
- Push inner ring of tapered roller bearing (maximum 3 mm less than width of lock nut) off input shaft by using lock nuts
- Pull off tapered roller bearing by using an extractor
- Remove lock nut and securing steel sheets
- Drive input shaft out of globoidal cam without using too much power on the cam followers
- Take old globoidal cam out of housing
- Put new globoidal cam with dwell angle area between two cam followers
- (Observe position of shaft key groove of output shaft)
- Drive input shaft into cam without using too much power on the cam followers
- Screw new securing steel sheets and new lock nuts on input shaft
- Heat tapered roller bearing (max. 80°C) and push over input shaft (replace defective bearings by new ones)
- Screw off eccentric cover. While doing so, make sure no preloading is produced between cam follower and cam, possibly move cam by using the lock nut or turn eccentric cover
- Check preloading of tapered roller bearing in dwell angle area, possibly by adjusting the eccentric cover
- Adjust mechanism without backlash by turning eccentric cover and/or by moving the cam

The height tolerance of the input shaft pivot may not exceed maximum 0,02 mm on the total length of the pivot.

An even contact reflection of the cam follower and globoidal cam is absolutely required

- check with inking past! –

- Screw lock nuts tightly and secure
- Screw eccentric cover tightly
- Turn input shaft with hand and check its even running, possibly repeat adjustment
- Cover all openings
- Put pins into eccentric cover (possibly earmark pin holes on same pc-diameter with same depth of bores, remove chips)
- Screw off eccentric cover, seal, bring into line above pin bore, tighten slightly, push pins and screw tightly
- Install new oil seals – seal housing cover and screw tightly
- Fill in oil

6.2.4 Replacing mechanism completely

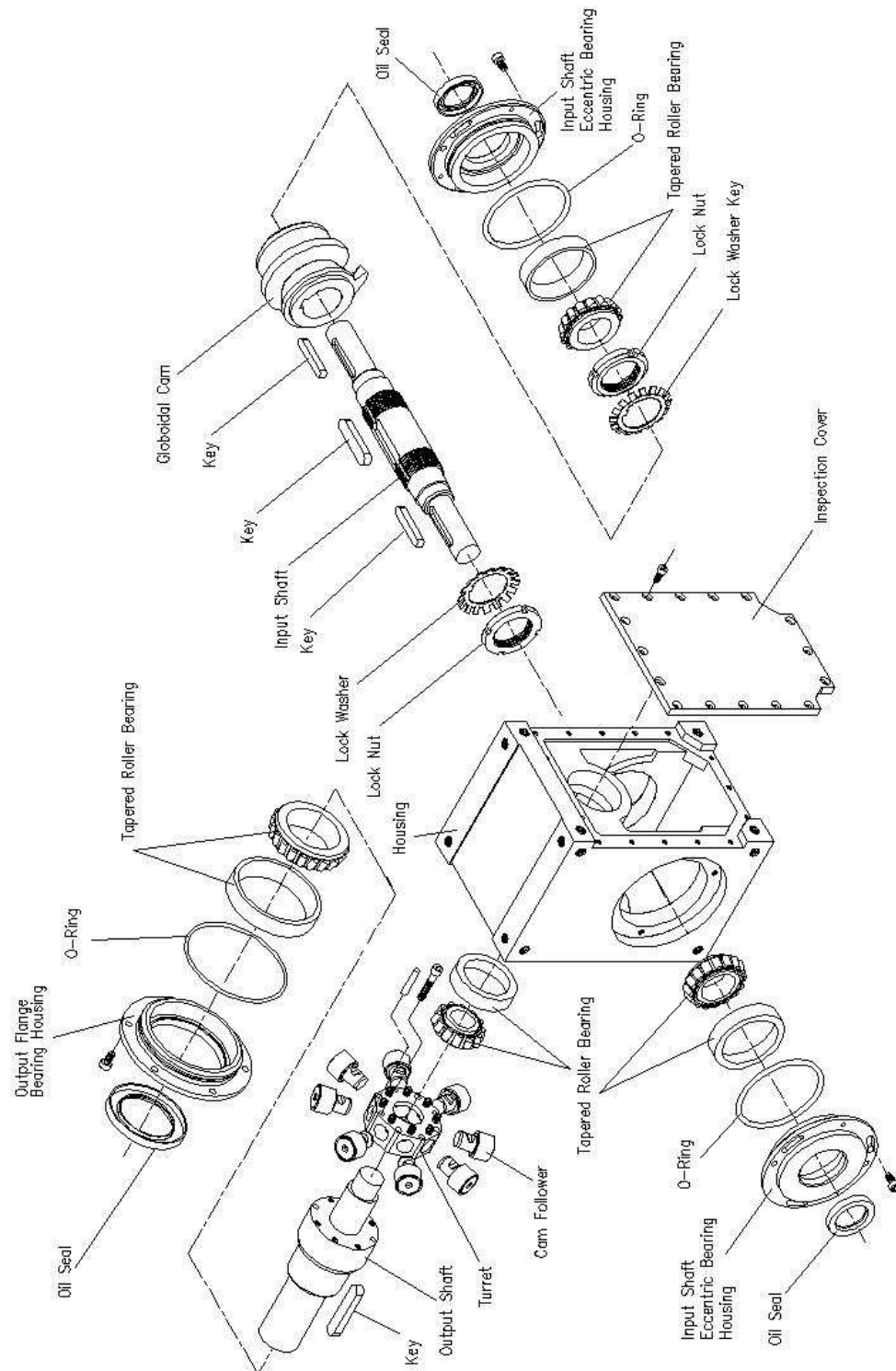
Please refer to chapter 6.2.1 to 6.2.3 for the instructions for disassembling and installation of the turret.

6.3 Tapered roller bearing

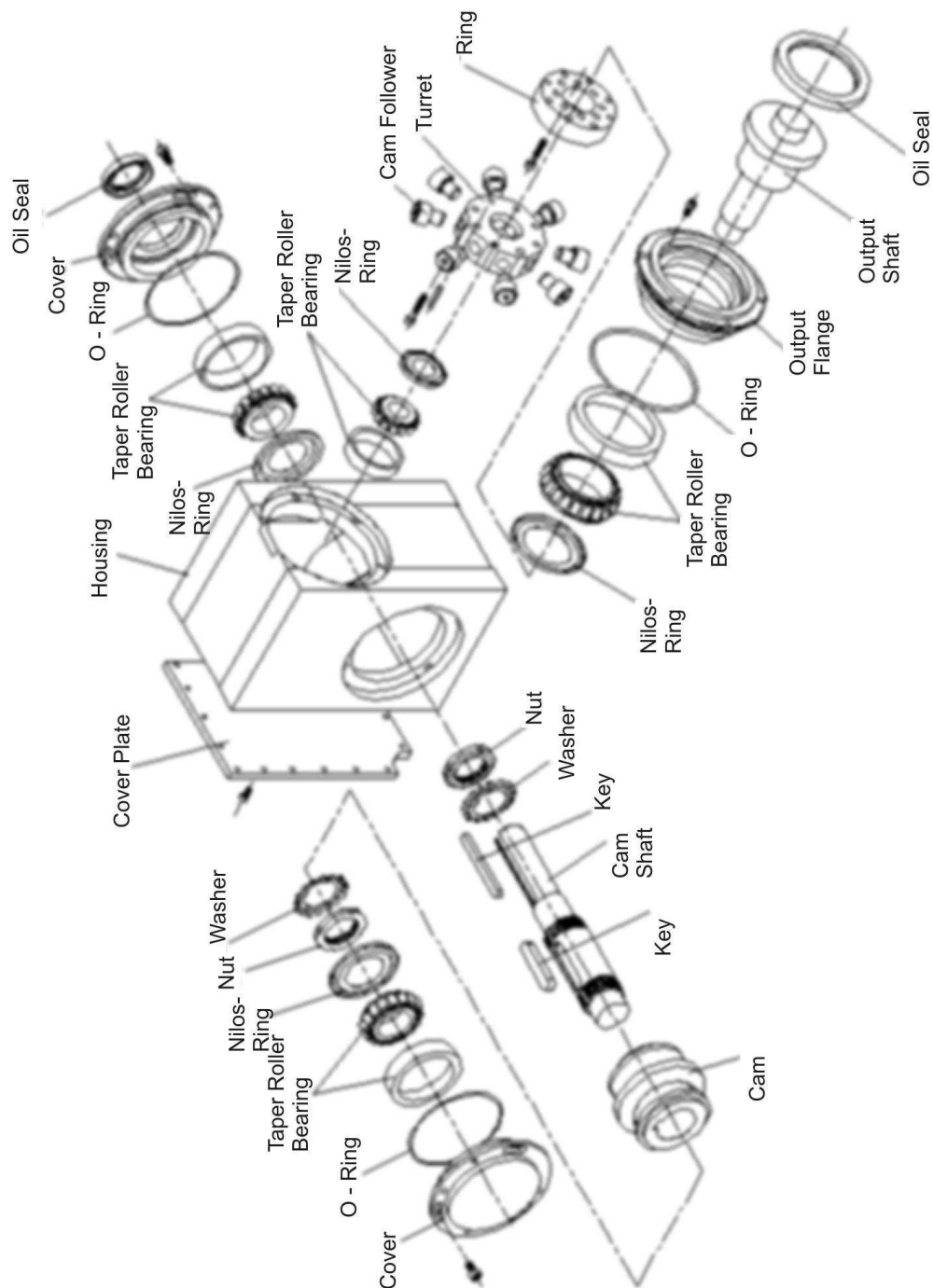
When installing new tapered roller bearings, it has to be observed that the bearings are adjusted free of play. If the backlash is too high or too low, this can be corrected by adjusting the housing cover or eccentric cover. Afterwards check the correct running of the mechanism by turning the input shaft, readjust if necessary.

6.4 Spare part drawing (HSG / HTSG)

HSG



HTSG



6.5 Spare and wearing parts

- 1. Mechanism
 - 1.1 Globoidal cam
 - 1.2 Turret
 - 1.3 Cam followers
- 2. Bearing set
 - 2.1 Tapered roller bearing output 1
 - 2.2 Tapered roller bearing output 2
 - 2.3 Tapered roller bearing output
- 3. Sealing set
 - 3.1 Oil seal output
 - 3.2 Oil seal input
 - 3.3 O-Ring output
 - 3.4 O-Ring input
- 4. Input shaft
- 5. Output shaft

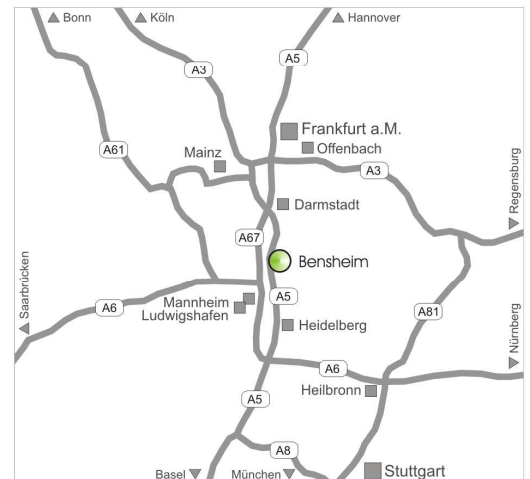
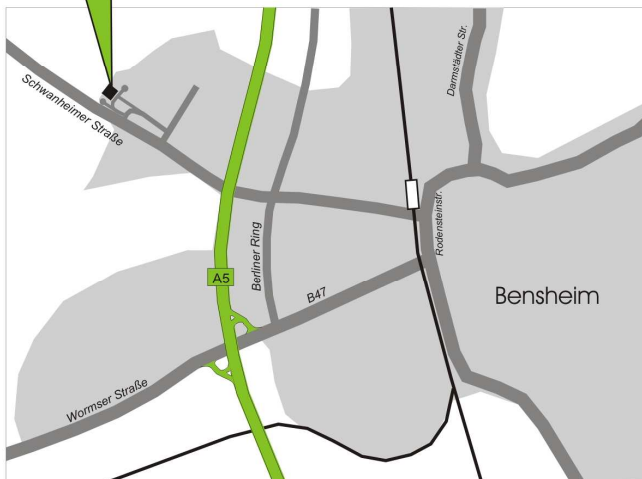
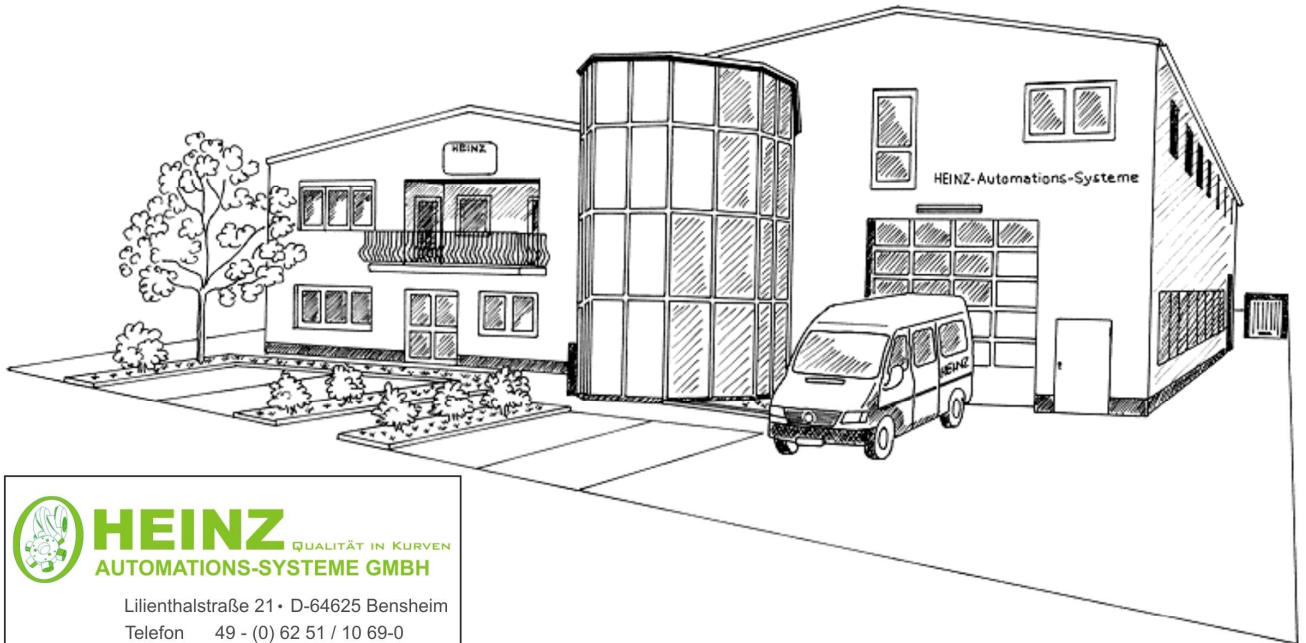
7. Final remark

All repair work requires a certain amount of experience and should therefore be carried out by HEINZ fitters.

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